

CLAIMS

39. (*Currently Amended*) An ocular implant device for modulating neuronal activity, said device comprising:

- (a) a housing having a surface biocompatible with at least a portion of a neuronal cell;
- (b) an aperture in said surface, wherein said surface is micropatterned for directing a neuronal cell process toward said aperture, and said aperture capable of receiving said neuronal cell process;
- (c) a reservoir containing a fluid connected to said aperture, said aperture providing a conduit for delivery of said fluid from said reservoir to said neuronal cell process in said aperture; and
- (d) a flow regulator pump in operable relationship with said fluid in said reservoir for moving said fluid to said aperture,

wherein said implant is oxidized and coated with a polyimide layer to reduce capacitance.

40. (*Currently Amended*) The device implant according to claim 39, wherein said flow regulator pump is an electromechanical device.

41. (*Currently Amended*) The device implant according to claim 39, wherein said flow regulator pump is an electrical device.

42. (*Cancelled*)

43. (*Currently Amended*) The device implant according to claim 39, wherein said fluid comprises a bioactive agent.
44. (*Currently Amended*) An ocular implant device for modulating neuronal activity, said device comprising:
- (a) a housing having at least one aperture and a surface biocompatible with at least a portion of a neuronal cell, said surface being micropatterned for directing growth of a neuronal cell process to said aperture, and said aperture capable of receiving said neuronal cell process;
 - (b) a reservoir containing a fluid connected by a channel to each said aperture, said aperture providing a conduit for delivery of said fluid from said reservoir to said neuronal cell process in said aperture; and
 - (c) an electrically controlled flow regulator pump in operable relationship with said fluid in said reservoir for moving said fluid to said aperture, wherein said device is oxidized and coated with a polyimide layer to reduce capacitance.
45. (*Currently Amended*) The device implant according to claim 44, wherein said micropattern comprises bioactive agents and directs growth of said neuronal cell process to said aperture.

46. (*Currently Amended*) The device implant according to claim 44, wherein said device implant comprises at least one photodiode as the electrical source for actuating said electrically controlled flow regulator pump.
47. (*Currently Amended*) The device implant according to claim 44, wherein said surface comprises a well, said aperture connecting said well with said reservoir via said channel.
48. (*Currently Amended*) An ocular implant device for modulating neuronal activity, said device comprising:
- (a) a housing of a flexible material having a surface biocompatible with at least a portion of a neuronal cell;
 - (b) an aperture in said surface, wherein said surface is micropatterned for directing a neuronal cell process toward said aperture;
 - (c) a reservoir connected to said aperture; and
 - (d) a flow regulator pump in operable relationship with fluid in said reservoir for moving said fluid to said aperture,
wherein said device is oxidized and coated with a polyimide layer to reduce capacitance.
49. (*Currently Amended*) The device implant according to claim 48, wherein said flexible material is a polysiloxane.

50. (*Currently Amended*) The device implant according to claim 48, wherein said housing is comprised of two layers:

- (a) a first layer comprising at least one reservoir and at least one channel, each of said at least one reservoir connected to one of said at least one channel; and
- (b) a second layer covering said first layer enclosing said at least one reservoir and said at least one channel and having an aperture in communication with said at least one reservoir.

51. (*Currently Amended*) The device implant according to claim 50, wherein said second layer is micropatterned for directing growth of a neuronal process to said aperture.

52. (*Currently Amended*) The device implant according to claim 48, wherein said fluid comprises a bioactive agent.

53. (*Currently Amended*) The device implant according to claim 48, wherein said flow regulator pump is an electromechanical device.

54. (*Currently Amended*) The device implant according to claim 53, wherein said device implant comprises photodiodes and said electromechanical device is actuated by photodiodes.

55. (*Currently Amended*) The device implant according to claim 48, wherein said flow regulator pump is an electrical device.

56. (*Currently Amended*) The device implant according to claim 55, wherein said device comprises photodiodes and said electrical device is actuated by photodiodes.

57. (*Currently Amended*) A method for stimulating a neuronal cell, said method comprises inserting in proximity to a neuronal site an implant device according to claim 39, wherein said fluid comprises a bioactive agent.

58. (*Previously Presented*) The method according to claim 57, wherein said neuronal site is a retinal site.

59. (*Previously Presented*) The method according to claim 57, wherein said bioactive agent is a neurotransmitter.

60. (*Previously Presented*) A method for stimulating a neuronal cell, said method comprises inserting in proximity to a neuronal site an implant device according to claim 48, wherein said fluid comprises a bioactive agent.

61. (*Previously Presented*) An ocular implant device for modulating neuronal activity,
said device comprising:

- (a) a housing having a surface biocompatible with at least a portion of a neuronal cell;
- (b) an aperture in said surface;
- (c) a reservoir connected to said aperture; and
- (d) a flow regulator pump in operable relationship with fluid in said reservoir for moving said fluid to said aperture, wherein said flow regulator comprises at least one of a flexible housing, a flexible membrane pump or a light sensitive polymer flow regulator,
wherein said device is oxidized and coated with a polyimide layer to reduce capacitance.